

Operating Instructions

LED Powerline PLD



Masthead

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Warning notes and symbols in the operating instructions

These Operating Instructions describe the LED Powerline PLD, its operation and its uses. The safety and warning notices explain the safe, proper handling of the LED Powerline PLD.

You will find the symbols listed below next to all safety and warning instructions in these operating instructions where there is danger to life and limb. An additional signal word indicates the severity of a possible danger.

Observe these notes closely and be especially careful in these cases in order to preclude accidents.

DANGER! marks an immediately threatening danger. If it is not avoided, death or very severe injuries will result. Damage to property is possible.

WARNING! marks a possible danger. If it is not avoided, death or very severe injuries could result. Damage to property is possible.

CAUTION! marks a possible danger. If it is not avoided, slight injury could result. Damage to property is possible.

The symbols used in these operating instructions have the following meaning:



This symbol warns of a hazard area.



This symbol warns of a hot surface.



This symbol warns of hazardous electrical voltage.

The two following symbols are used to address practices for optimal operation and/or prevention of damage to the equipment. These information are not related to hazardous situations. Additionally, the signal words **ATTENTION!** and **NOTE!** are used.



ATTENTION!

This symbol with signal word is found at those places in the operating instructions which must be observed so that damage or destruction of the equipment is prevented.



NOTE!

This symbol is found next to notes, tips on operation and useful information.

1 Description

The LED Powerline PLD is a high-performance array for intermediate curing (pinning) and final curing for inkjet printing. Another application is the curing of UV-reactive adhesives and casting compounds. As a result of the high intensity and the possibility to program entire program sequences – such as illumination sequences with varying intensities and latencies, for example – completely automatic production lines with minimal cycle times and/or machine processing times can be realized in particular.

The typical LED service life is 10,000 hours. The LEDs can be switched on and off as often as desired. No warm-up or cool-down phases are necessary.

Wavelengths of 365/375/385/ 395/405 nm \pm 5 nm are available.

This way the LED Powerline can be adapted to the respective application.

The light emitting aperture encompasses an area from 80 mm x 10 mm up to approx. 1400 mm x 10 mm (for detailed information, refer to "Dimensional drawing LED Powerline PLD", p. 22). The resultant irradiation line can then be divided into four (optionally eight) segments, which can be activated independently of each other.

External water cooling enables the extremely compact format, while offering the highest radiation intensity.

Features

| | |
|---|--|
| <ul style="list-style-type: none">• Extremely high irradiance despite minuscule dimensions• Long LED service life• Available in different wavelengths• Variable length of the LED unit (min. 80 mm)• The LED segments may be controlled individually• Program sequences• Intelligent output control | <ul style="list-style-type: none">• Operating hours counter for the LED integrated in the LED unit• Independent setting of the irradiation time, irradiation intensity and operating mode for each channel.• No warm-up period• No standby period |
|---|--|

Uses

The LED Powerline PLD can be used for the following applications in laboratories, in production and for making repairs:

- Used to dry inks and colour coatings, e.g. in inkjet printers
- Bonding and securing of components in just seconds, in the electronics, optical and medical sectors
- Bonding of glass, metals and plastics
- High-intensity UV irradiation in the chemical, biological and pharmaceutical industries
- Fluorescence excitation for materials testing and image processing

Features

Uses

Connections and Operating Elements

Connections and Operating Elements

The following figures show the LED Powerline PLD from both the front and rear view.

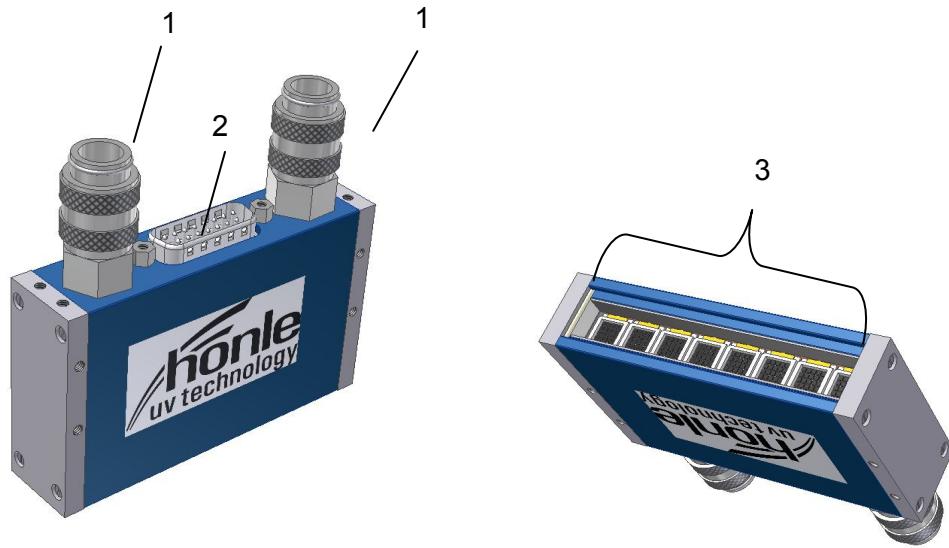


Fig. 1: LED Powerline PLD – rear view

Fig. 2: LED Powerline PLD – front view

| | |
|---|------------------------|
| 1 | Water connections |
| 2 | Electrical connections |
| 3 | LED line |

2 Safety

General Notes

Familiarity with all basic safety regulations is the prerequisite for safe handling and problem-free use of the LED Powerline PLD.

These Operating Instructions contain the most important notes for operating the unit in a safe manner.

The Operating Instructions, especially the Safety Notes, must be observed by everyone who works with the unit.

In addition, all applicable rules and regulations on accident prevention for the use area must also be observed.

DIN EN 62471: 2008 ("Photobiological safety of lamps and lamp systems") and

BGI 5006 (Oct. 2006) are referred to here.

The proprietor must check the safety-conscious work performance of personnel at regular intervals.

In accordance with the workplace safety regulations, the proprietor is advised to make a reasonable and sufficient assessment of the risks arising from the use of the LED Powerline PLD. You must ensure that adequate control measurements are maintained in order to eliminate or minimise these risks. You can use the information contained in these Operating Instructions when making the risk assessment.

General Notes

Risk Group

Risk Group



Danger

Improper use can endanger the health of the user or of third parties (severe skin or eye damage)!

The Höne LED Powerline PLD is subject to the standard DIN EN 62471:2008 ("Photobiological safety of lamps and lamp systems"). It is classified as belonging to Risk Group 3, which requires special safety measures to be observed when operating it. These are described in detail in the stated DIN EN standard.

Due to the size of the LED Powerline PLD, it is not possible to directly label the unit. The proprietor must therefore ensure that appropriate identification of the danger area is made in the immediate vicinity of the LED Powerline PLD.



*Obligation of
Personnel*

Obligation of Personnel

Persons, who are assigned to work with the LED Powerline PLD, undertake, before starting work to:

- observe the regulations on work safety and accident prevention,
- read the safety chapter and the warning notices in these Operating Instructions and to observe them at all times during operation,
- in particular, to observe the safety measures in of DIN EN 62471: 2008 ("Photobiological safety of lamps and lamp systems") and observe BG 5006.

*Dangers from
Handling the
Unit*

Hazards from Handling the Unit

The LED Powerline PLD is assembled according to the technological state-of-the-art and recognised safety standards.

The following potential hazards can occur:

- **Electrical hazards**
- **Hazards from UV radiation (actinic UV, close UV)**
- **Hazards from blue light (300 – 700 nm)**
- **Thermal hazards**

The unit must be used only under the following circumstances:

- When wearing personal safety equipment to protect the eyes and skin, in case complete shielding of the UV radiation cannot be ensured. Goggles should conform the standard EN 170 (max. spectral transmission (365 nm) 0.3%), and should afford protection from radiation, both directly and from the side.
- The LED Powerline PLD must be set up and operated in such a way that persons are not subjected to direct or indirect radiation. UV-absorbent plastics or metal sheet can be used as shields.
- Warning notices must be affixed at the workplace and at all entrances to the work area.
- Under no circumstances must the LED Powerline PLD be operated in explosion-protected areas or in the proximity of flammable materials, gases or liquids.
- The LED Powerline PLD must be operated only by persons who have been instructed in all the safety precautions.
- The LED Powerline PLD must be used only when it is in flawless condition in terms of safety. Operation is not permitted when there is visible damage to the housing, water hoses, supply cables or the mains adapter.
- Proper functionality of the entire cooling unit must always be ensured.
- All relevant regulations on accident prevention and on the handling of units belonging to Risk Group 3 must be observed.



Danger

Improper use can endanger the health of the user or of third parties (severe skin or eye damage)!

Intended Use

The LED Powerline PLD is a high-intensity UV irradiation device for irradiating large areas from a close distance. Any other or additional usage is regarded as improper use, and is thus dangerous.

The LED Powerline PLD must not be used for medical or therapeutic purposes, for skin-tanning, or in other medical equipment. The unit must be used indoors only. Outdoor use is not permitted.

The operator must operate the unit only in accordance with the usage notes in these Operating Instructions.



Danger

There is acute danger of becoming blind if you look directly into the radiation outlet aperture! If improperly handled, UV radiation can damage skin and eyes! It can lead to severe sunburn or to inflammation of the retina and conjunctiva, and possibly to skin cancer.

Organisational Measures

The functions of all the existing safety equipment must be inspected regularly before the start of work or of each new shift. Look for outwardly visible damage.

Informal Safety Measures

The general and local regulations on accident prevention and environmental protection must be provided and observed as a supplement to the Operating Instructions.

Checking the Water Lines

Water lines, connections and couplings of the water cooling must be regularly checked for leak-tightness.

Electrical Hazards

The electrical equipment on the LED Powerline PLD must be inspected regularly. Inspection before starting work:

- Check all components of the unit for outwardly visible damage
- Check that all electric cables are in flawless condition
- Loose connections must be repaired immediately, and damaged cables must be replaced.



Danger

There is danger of direct or indirect contact with electricity!

Intended Use

Organisational Measures

Informal Safety Measures

Checking the Water Lines

Danger from Electrical Power

*Danger from
UV Irradiation*

Hazards from UV Irradiation

The LED Powerline PLD emits radiation in the range of 340 – 440 nm, depending on the device type. The optical output power is detailed in the Technical Data chapter. When working with the unit, the following instructions must also be followed:

- Personal safety equipment must be worn to protect the eyes and skin, unless the UV radiation is completely screened by structural measures.
- Never look directly or indirectly into the LED aperture.
- The LED Powerline PLD must be set up in such a way that persons are not subjected to direct or indirect radiation.
- In the case of workplaces where manual work is performed or in mobile applications, the working area must be enclosed in an appropriate manner.



Danger

There is acute danger of becoming blind if you look directly into the radiation outlet aperture!

If improperly handled, UV radiation can damage skin and eyes! It can lead to skin burns or to inflammation of the retina and conjunctiva, and possibly to skin cancer.



Warning

UV radiation can cause material damage to electronic components.

When used in the vicinity of the LED Powerline PLD, these components must be protected from UV radiation.



Warning

UV radiation accelerates the ageing of materials.

UV-sensitive objects and surfaces must therefore be protected from radiation.



Note

Protective articles are listed in the chapter "Ordering Data for Units, Replacement Parts and Accessories".

Thermal Hazards

When operating the LED Powerline PLD, take the following thermal risks into account.

- The LED Powerline PLD can heat up to a temperature of 60 °C during operation. There is a risk of burns. It must be ensured that the units cannot be touched.
- The tightly bundled radiation of the LED can lead to heating-up of the radiated surfaces, especially dark surfaces. There is a risk of burns.
- Under no circumstances must the unit be operated in the vicinity of flammable or explosive materials, gases or liquids. There is an acute risk of fire or explosion.
- To protect against the danger from heat, the same measures must be taken that are effect against the
- Danger from UV Irradiation
- Hazards from UV Irradiation (see the chapter
- Danger from UV Irradiation
- Hazards from UV Irradiation).



Danger

The LED Powerline PLD emits highly-intensive, bundled radiation. Improper use can endanger the health of the user or of third parties (severe skin or eye damage)!

Warranty and Liability

The Dr. Höne AG "General Conditions of Sale and Delivery" always apply. They are available to the user upon signing the contract, at the latest.

Dr. Höne AG assumes no liability whatsoever for damages that can be attributed to one or more of the following causes:

- Improper use of the LED Powerline PLD contrary to its intended use
- Incorrect assembly, commissioning or operation of the LED Powerline PLD
- Failure to observe notes in the Operating Instructions
- Unauthorised structural modification of the LED Powerline PLD
- Effects of foreign objects or mechanical damage (caused by blows, jolts, etc.)
- Contamination of the quartz glass pane of the LED Powerline PLD
- Contamination of the water-cooling element as a result of using unsuitable or contaminated coolant.
- Failure of the cooling unit and/or operation of it that is non-compliant with the specified operating conditions (see Technical Data)
- Disastrous occurrences
- Acts of God

Thermal Hazards

Warranty and Liability

*Maintenance
and Fault Re-
moval*

Maintenance and Fault Removal

All necessary maintenance tasks are described in the chapter "Service, Maintenance and Cleaning". Carrying these out ensures reliable operation.

Should a fault occur in the unit that cannot be rectified with the help of the Operating Instructions, then Dr. Höhle AG Customer Service must be contacted.

Parts that are not in flawless condition must be exchanged immediately.

Use only original replacement and wear parts.

There is no guarantee that other manufacturers' parts are designed and manufactured to meet the required standards of robustness and safety.

No alterations, additions or modifications must be made to the LED Powerline PLD without the permission of Dr. Höhle AG.

Contact address for claims under warranty, repair and replacement part service:

Dr. Höhle AG

UV-Technologie

Lochhamer Schlag 1

D-82166 Gräfelfing / Munich, Germany

Tel.: +49 (0)89 / 856 08-0

Fax: +49 (0)89 / 856 08-148

E-mail: uv@hoenle.com

Website: www.hoenle.de



Warning

No repairs or alterations must be made to the unit except those described in these Operating Instructions.



Warning

Only original Dr. Höhle AG replacement parts and wear parts must be used. It cannot be guaranteed that parts supplied by third parties are designed/manufactured in a manner that meets the required degree of safety and performance.

3 Transport, Storage, Delivery

Scope of Delivery of the LED Powerline PLD:

- LED Powerline PLD
- Operating Instructions (on CD)

Scope of Delivery

The delivered parts must be inspected for completeness and damage or other issues.

Any damage that has been ascertained must be documented at once, and reported to the dealer or to Dr. Höne AG without delay.

The following components are also required to operation the LED Powerline PLD:

- PLD modules (1 module per 40 mm LED unit; min. 2 x)
- LED Powerline PLD connection cable
- Filter unit
- Cooling unit
- Water connections (hoses, couplings, etc.)

Note

Please dispose of the packaging material in an environmentally responsible manner. It may be possible to reuse it. It is recommended to keep the packaging material, in case the unit has to be sent by post or otherwise transported.

4 Installation, Commissioning and Operation

General Information

- It is imperative to comply with the specified operating conditions for the water cooling (see the chapter Water Connection).
- The LED Powerline PLD must be mounted on a stable fixture.
- The ambient temperature for operating the LED Powerline PLD must not exceed a maximum of 35 °C.
- Without exception, the LED Powerline PLD must only be connected or disconnected with the PLD modules switched off! If the LED Powerline PLD is disconnected during ongoing operations, this could cause damage to the device and/or a component.
- Do not touch the contact pins in the LED Powerline PLD plug connector with your fingers (danger of ESD damage).
- Protect the LED Powerline PLD against chemical vapours and cleaning agents.
- Only operate the LED Powerline PLD in dry rooms (rel. humidity max. 70%; non-condensing). Open-air operation is not permitted.
- Before switching on, check to ensure that all plug-type connectors, incl. water connections, are properly seated and tight.
- It should be observed that the LED Powerline PLD is not exposed to any spray water. Furthermore, no condensation may form on the surface of the spotlight.



Danger

Sufficient cooling must be provided for when installing the LED Powerline PLD. It is forbidden to operate the device in the immediate vicinity of flammable objects, liquids or gases.

The dimensions for the LED Powerline PLD can be found in the dimensional drawings in the chapter 7 Technical Data.

Electrical Connections

The supply with electric current and activation of the LED Powerline PLD is accomplished via the LED Powerline PLD switch cabinet (*short form: PLD switch cabinet*¹). For detailed information on the electrical connections, refer to the PLD switch cabinet Operating Instructions in the chapter "Electrical Connections".

Electrical Con-
nections



Warning

The LED Powerline PLD must only be used with the PLD switch cabinet.



Warning

Connecting and disconnecting of the LED Powerline PLD must only be done when the PLD switch cabinet is in a switched off state. Use the main switch on the back of the device for this purpose. Otherwise damage could occur to the LED Powerline PLD or the PLD switch cabinet.

¹ In the following this short form is used for the unit.

Water Connection

Water Connection

It is imperative to comply with the following connection information/operating conditions for the LED Powerline PLD and the filter unit:

| | |
|---|---------------------------------------|
| • Filter unit connections | 1/4“ BSP inside thread |
| • LED Powerline PLD connections | coupler socket NW 5 BA (self-closing) |
| • Pressure range (min./max.) | 2.5 bar – 3.0 bar |
| • Pore size of the filter | 140 µm |
| • Max. inflow water temperature: | 25 °C |
| • Min. inflow water temperature | 16 °C |
| • Coolant | demineralised water |
| • Max. distance filter unit – LED Powerline PLD | 1 m |

- **Make sure that no condensation may form on the surface of the spotlight.**
- **The filter unit for the coolant must always be in flawless condition. It must be checked daily and, if necessary, replaced without delay.**
- **The coolant must be regularly inspected for contamination and, if necessary, replaced entirely.**
- **Use a broadband biocide to avoid the formation of algae/germs in the water.**
- **When connecting or disconnecting, it is imperative to ensure that no water gets onto the LED Powerline PLD or into the connector plug.**



Warning

Condensation may lead to destruction of the device!

It is absolutely essential to avoid any **formation of condensed water on the surface of the LED Powerline PLD**. The proprietor has therefore to provide adequate climatic conditions at site (air humidity, temperature). The temperature of the cooling water may be adjusted, if necessary.



Warning

The cooling parameters must be adhered to without fail, otherwise damage could occur to the LED Powerline PLD.

Installation setup

The following components are necessary to operate the LED Powerline PLD:

- LED Powerline PLD
- Cooling unit
- PLD switch cabinet

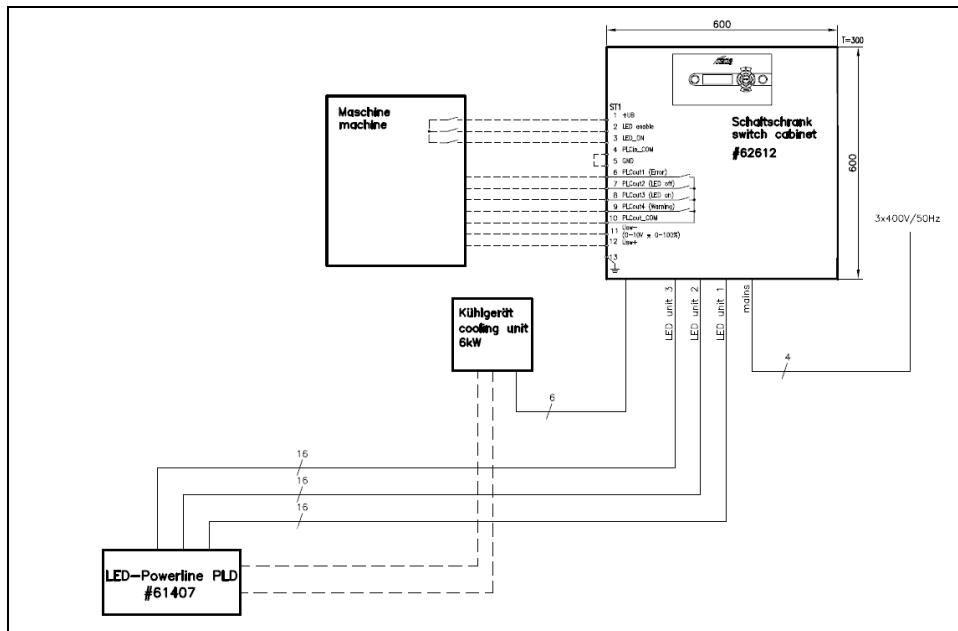


Fig. 3: Installation Setup

Connecting the Water Cooling to the LED Powerline PLD

1. Connect the inflow line of the cooling unit to the filter unit.
2. Hook up the connector of the filter unit with the LED Powerline PLD (max. distance = 1 m).
3. Hook up the return line of the cooling unit with the second connector on the LED Powerline PLD.

The device is now ready for operation and can be switched on via the main switch.



Warning

Condensation may lead to destruction of the device!

It is absolutely essential to **avoid any formation of condensed water on the surface of the LED Powerline PLD**. The proprietor has therefore to provide adequate climatic conditions at site (air humidity, temperature). The temperature of the cooling water may be adjusted, if necessary.



Warning

All connections must be checked for leak-tightness immediately after being switched on for the first time and then regularly thereafter. If there are any leaks, the system must be switched off immediately. It may only be switched on again after all flaws have been corrected and the released water has dried up completely.

5 Service, Maintenance and Cleaning

General Information

General Information

Service, repair and cleaning work may only be performed by authorized personnel.

- When performing service, maintenance and cleaning, it must be ensured that the outlet aperture of the LED Powerline PLD is not dirtied by fingerprints or other contaminants.
- Likewise, no sprayed water may contact the surface of the LED Powerline PLD.
- In general, work should be performed with a clean cloth or clean gloves.
- Only touch the LED Powerline PLD on the metal housing.
- If necessary, clean the outlet aperture of the LED Powerline PLD when it is cold, using a clean cloth and alcohol.



Note

Contamination of the outlet aperture due to fingerprints or the like reduces the UV output of the LED Powerline PLD.

Service

Service

The following service work is performed on the LED Powerline PLD:

Daily:

- Inspection of the LED Powerline PLD for damage to and contamination of the outlet aperture.
If necessary, the outlet aperture must be cleaned; see the chapter "Cleaning".
- Inspection of the filter unit
- Inspection of the leak-tightness of the water connections

As needed / at regular intervals (dependent on operating conditions)

- Replacement of the filter unit (see the chapter Filter Change).

Cleaning

Cleaning



Note

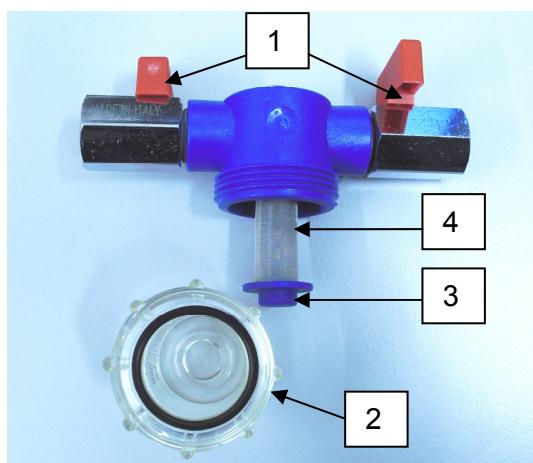
When cleaning, do not use any aggressive or abrasive cleaning agents.

If operated in a dusty environment or in the presence of fumes from adhesives, the radiation emission surface of the LED Powerline PLD can become contaminated. This diminishes the UV intensity.

- Clean the radiation aperture surface with a clean, lint-free cloth and alcohol or acetone.

Filter Change

1. Switch off the PLD switch cabinet (main switch in position 0).
2. Switch off the cooling unit and detach it from the mains supply.
3. Counterrotate both of the red shutoff valves (1) of the filter unit by 90 ° to the flow direction (= position OFF, see Fig. 4).
4. Unscrew the reservoir container (2) from the filter unit and remove it. When doing this, watch out for remaining water that might leak out of the reservoir container and collect in an appropriate vessel if necessary.
5. Remove the attachment screw (3) and filter (4).



- 1 Shutoff valve
(in position OFF)
- 2 Reservoir container
(with O-ring)
- 3 Attachment screw
- 4 Filter

Fig. 4: Components of the filter unit

6. Put the new filter in place and fasten it securely with the attachment screw.
7. Screw the reservoir container onto the filter unit.
8. Rotate both shutoff valves of the filter unit into the OPEN position (= parallel to the flow direction)
9. Reconnect the cooling unit to the mains supply and switch it on.
10. After first switching on the system again, check the filter unit for leak-tightness.

Filter Change

6 Ordering Data for Units, Replacement Parts and Accessories

Ordering

Ordering

Order replacement parts from our replacement-parts service at the following address:

Dr. Höne AG
UV-Technologie
Lochhamer Schlag 1
D-82166 Gräfelfing / Munich, Germany

Tel.: +49 (0)89 / 856 08-0
Fax: +49 (0)89 / 856 08-148

*Replacement
Parts / Acces-
sories*

Replacement Parts / Accessories

| Designation | Article/Order Number |
|---|----------------------|
| UV warning sign | 45890 |
| Operating Instructions (German/English) | 62252 |
| Documentation LED devices (German/English) on CD | 47778 |
| Filter unit | 46825 |
| Insert for filter unit | 46726 |



Warning

Only original replacement parts from Dr. Höne AG may be used. If any third-party parts are used, then the operational safety of the LED Powerline PLD cannot be ensured.

7 Technical Data

LED Unit

For detailed information please refer to the type plate of the LED unit.

LED unit

Water Cooling Operating Conditions

It is imperative to comply with the following connection information/operating conditions for the LED Powerline PLD and the filter unit:

| | |
|---|---------------------------------------|
| • Filter unit connections | 1/4“ BSP inside thread |
| • LED Powerline PLD connections | coupler socket NW 5 BA (self-closing) |
| • Pressure range (min./max.) | 2.5 bar – 3.0 bar |
| • Pore size of the filter | 140 µm |
| • Max. inflow water temperature: | 25 °C |
| • Min. inflow water temperature | 16 °C |
| • Coolant | demineralised water |
| • Max. distance filter unit – LED Powerline PLD | 1 m |

- **Make sure that no condensation may form on the surface of the spot-light.**
- **The filter unit for the coolant must always be in flawless condition. It must be checked daily and, if necessary, replaced without delay.**
- **The coolant must be regularly inspected for contamination and, if necessary, replaced entirely.**
- **Use a broadband biocide to avoid the formation of algae/germs in the water.**
- **When connecting or disconnecting, it is imperative to ensure that no water gets onto the LED Powerline PLD or into the connector plug.**

Water Cooling



Warning

Condensation may lead to destruction of the device!

It is absolutely essential to **avoid any formation of condensed water on the surface of the LED Powerline PLD**. The proprietor has therefore to provide adequate climatic conditions at site (air humidity, temperature). The temperature of the cooling water may be adjusted, if necessary.

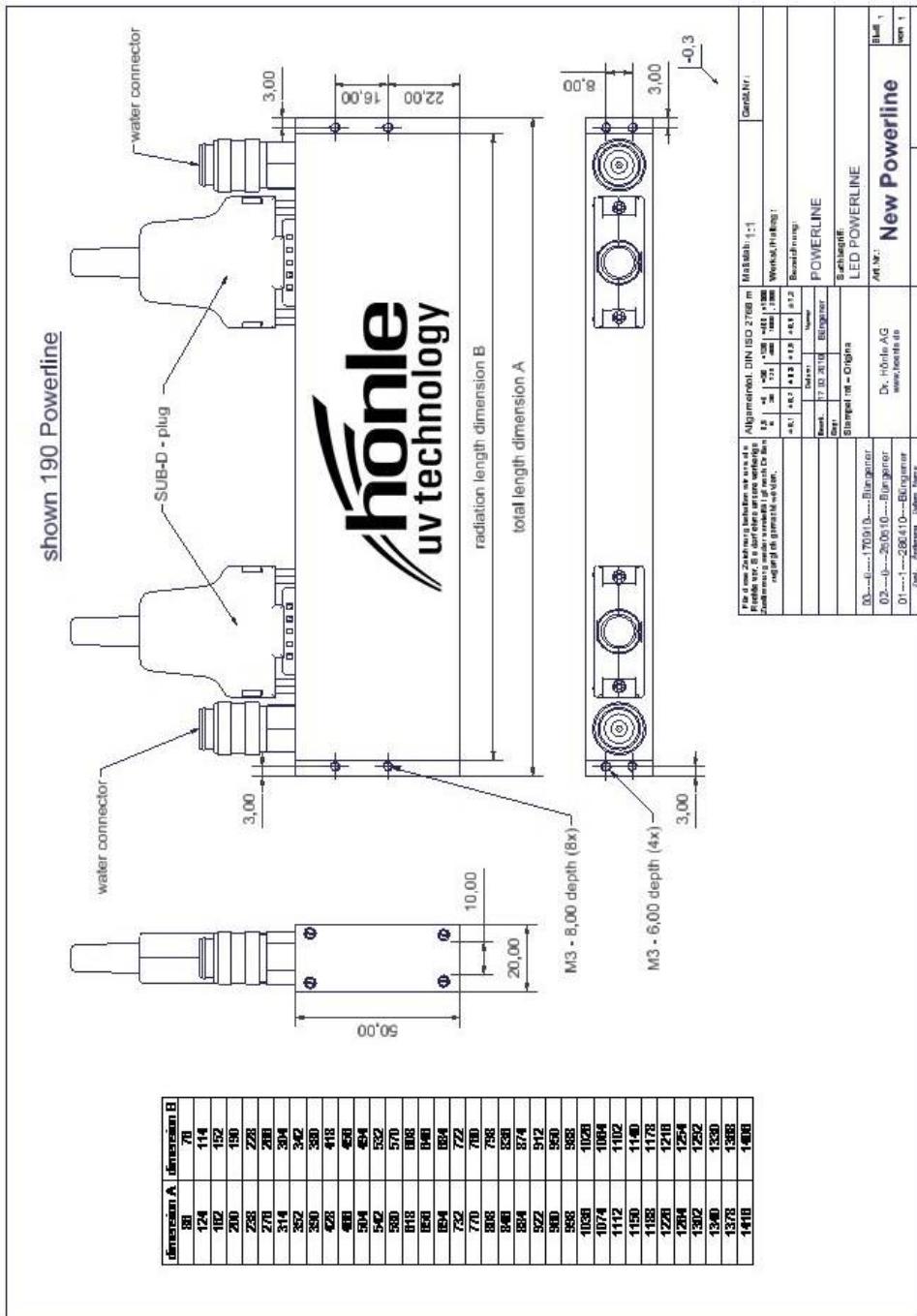


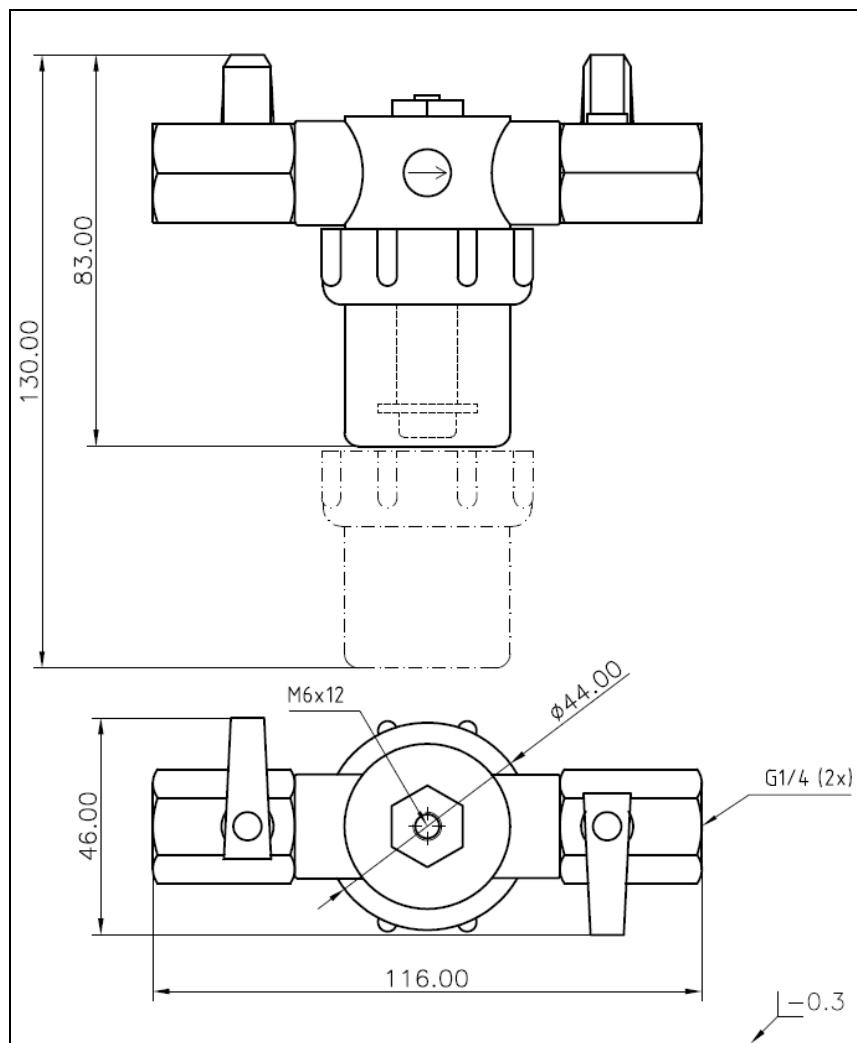
Warning

The cooling parameters must be adhered to without fail, otherwise damage could occur to the LED Powerline PLD.

Dimensional drawing LED Powerline PLD

*Dimensional
drawing LED
Powerline PLD*



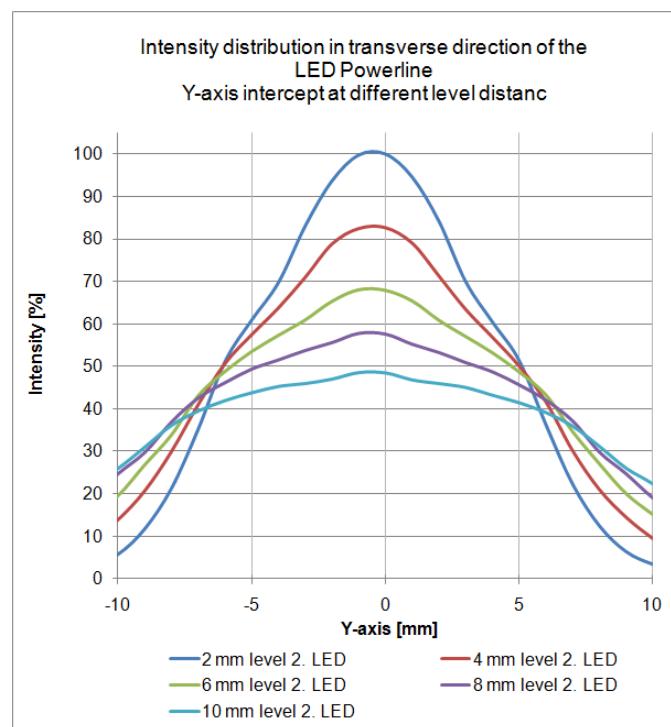
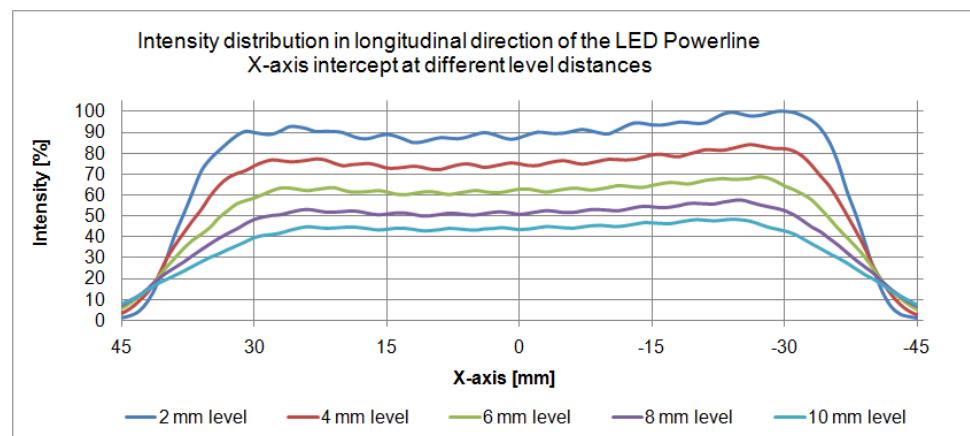
Dimensional Drawing of the Filter Unit

Dimensional drawing of the filter unit

Optical Data

Optical Data

Typical intensity characteristics (in %; distance in mm)



Relative spectral irradiance